Run 3 Closeout: DAQ

John Haggerty
Brookhaven National Laboratory

DAQFEST

Post-mortems on Run 2 and Run 3 --
http://www.phenix.bnl.gov/~phoncs/daqfest/

Many topics will be covered separately today--

- Event Builder Brian
- Monitoring Chris
- Computing (including archiving) Martin
- "Common systems" John H.

So I won't repeat any of that

DAQFEST Conclusions

- A meeting among Brian Cole, John Haggerty, Ed O'Brien, and Bill Zajc confirmed Brian's responsibility for Event Builder development and its resultant performance.
- The BNL group will help on the Event Builder in the areas of JSEB, Gigabit networking, data logging, monitoring, and testing in Linux.
- Work on multievent buffering in all systems will be concluded with the goal of beginning Run 4 with 3 event buffering in all systems.
- In a joint effort with offline, replacing Objectivity with one of the free relational databases will be considered before Run 4. The difficulty of this task will be evaluated by the beginning of July and reported to the collaboration.
- It was agreed to push the data logging speed as high as feasible by additional buffer boxes and other techniques, such as compression.
- Basic software version upgrades are not expected to be a major project this year; upgrades to OrbixASP 6.0, Red Hat 9.0, JDK 1.4, gcc 3.2 are thought to be straighforward, and will be incorporated in new versions over the summer.
- Further attempts to optimize DCM software to take data at the highest possible speeds will be attempted, making sure that all systems can push data into the SEB at the highest possible speeds.

New For Run 3

- Detectors and electronics
  - MUTR.N, MUID.N
  - FCAL
  - BB electronics racks rebuilt and reinstalled
  - MVD in routine operation
- Online hardware and software
  - Many version changes and upgrades (CORBA, Linux, etc.), Ed leading the charge
  - Build procedures standardized and made bulletproof by Chris
  - Run control, Partition Server, EvB Server moved to Linux by Steve
  - New 4 TB disk arrays added by Martin

Run 3 In a Nutshell

According to the runcontrol database, "A total number of 1000467817 events were recorded in 1297 runs" in runs called PHYSICS between runs 60000 and 100000 with more than 1000 events

- December 23 First d-Au collisions
- January 13 (64655) BigRun3(6)
- March 23 (80312) BigRun3(51) End of d-Au run
- April 11 (83478) PPRun3(3)
- April 30 (87113) PPRun3(36) 55x55 collisions
- May 30 (92246) PPRun3(56) End of RHIC operations
- June 6 End of Run 3

FEM Operational Issues

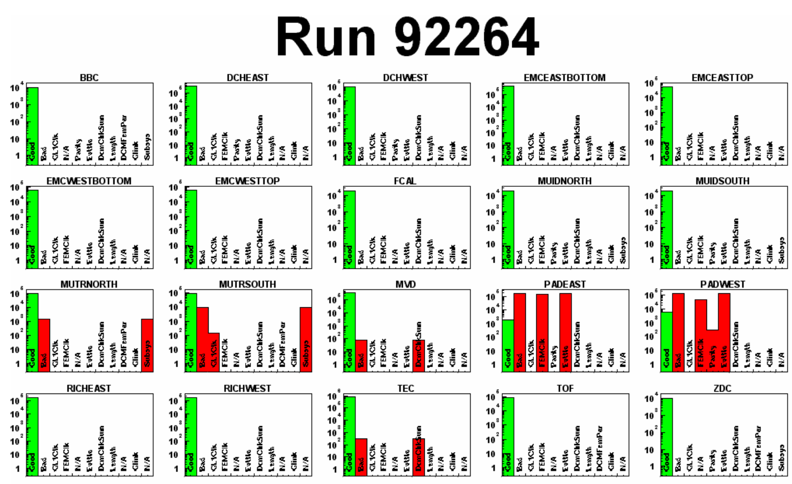
BB/ZDC/NTC	No operational problems; long time for full initialization
MVD	Occasional noisy pedestals, but operationally stable otherwise
DC	DC-DC converter failures at the beginning of the run
PC	No operational problems
TEC	Missing significant number of FEM's; some reliability problems
RICH	No operational problems; long time for initialization
TOF	One minor problem with timing fanout, but then we nearly blew up the rack
EMCAL	Occasional FEM acting up
MUTR	Random DCM glink lock problems; MUTR.S Station 5/6 GLINK-CLINK Crate power marginal
MUID	No operational problems, but synchronization with GL1 looms as a future difficulty

FEM Functional Issues

BB/ZDC/NTC	
MVD	Is the noise performance ok?
DC	
PC	Multievent buffering
TEC	
RICH	
TOF	
EMCAL	Shortening CONVERT/ENDAT time; "short" format
MUTR	
MUID	Synchronization to GL1 trigger

Multievent Buffering

- The final test of multievent buffering with the whole detector (runs 92262-92265) still had a problem with the pad chamber, but much progress has been made
- The other systems look at least nominally ok
- Miljko will be back soon, and will hopefully complete this over the summer



Database Issues

- Objectivity caused considerable distress during the run, and there is a growing consensus to replace it, possibly before Run 4
- Most of the work of conversion is in the calibration databases (not online)
- The significant uses of Objectivity that could be replaced online are:
  - Level 1 configuration
  - Level 2 configuration
  - Logbook
- It seems quite clear that PostgreSQL is the database we'll choose, and it will probably prove adequate

Uptime and Operations Observations

- I don't have an easy way to estimate DAQ uptime, but it could be better; it was probably never more than 75% (BaBar brags about greater than 95% uptime), and during any transition periods, it was much less
- The DAQ Operators were a big leap forward
- The way to high efficiency is to be ready in advance, with all the "final" pieces in place and taking data on cosmics before the beam comes on
- That would mean the detector assembled by October 15 and changes frozen after that if the run starts November 15